10-24-00

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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.:	D/99807	Total Pages:	3
First Named Inventor or Application Identifier			
Dennis L. Venable			
Express Mail Label No.:	EL700563734US		

APPLICATION ELEMENTS

See MPEP Chapter 600 concerning utility patent application contents.

ADDRESS TO: **Commissioner for Patents, Box Patent Application, Washington, DC 20231**

1. ☒ Fee Transmittal Form (Submit an original, and a duplicate for fee processing)
2. ☒ Specification (incl. claims) (Total Pages: 8)
3. ☒ Drawing(s) (35 USC 113) (Total Sheets: 1)
   ☐ Informal ☒ Formal
4. ☒ Oath or Declaration (Total Pages: 2)
   a. ☒ Newly executed (original or copy) ☐ Unexecuted
   b. ☐ Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional with Box 17 completed) *[Note Box 5 below]*
      ☐ i. DELETION OF INVENTOR(S) Signed statement attached deleting Inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference *(usable if Box 4b is checked)* The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Microfiche Computer Program (Appendix)
7. Nucleotide and/or Amino Acid Sequence Submission (If applicable, all necessary)
   a. ☐ Computer Readable Copy
   b. ☐ Paper Copy (Identical to computer copy)
   c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. ☒ Assignment Papers (cover sheet & document(s))
9. ☐ 37 CFR 3.73(b) Statement (when there is an assignee) ☒ Power of Attorney
10. ☐ English Translation Document (if applicable)
11. ☒ Information Disclosure Statement (IDS)/PTO-1449 ☒ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
14. ☐ Small Entity Statement(s) ☐ Statement filed in prior application, Status still proper and desired
15. ☐ Certified Copy of Priority Document(s) (If foreign priority is claimed)
16. ☐ Other:

17. ☐ If a **CONTINUING APPLICATION**, *check appropriate box and supply the requisite information:*
    ☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: /

18. **CORRESPONDENCE ADDRESS**

☐ *Same as prior application* ☒ *Correspondence address below*

NAME	John E. Beck				
ADDRESS	Xerox Corporation, Xerox Square - 20A				
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19. ☐ Cancel in this application original claims: of the prior application before calculating the filing fee. (At least one original independent claim is retained for this filing).

20. ☒ The filing fee is calculated below:

CLAIMS AS FILED, LESS ANY CLAIMS CANCELED BY ABOVE-INDICATED AMENDMENT(S)				
(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
TOTAL CLAIMS (37 CFR 1.16(c))	**12** - 20 =	**0**	x $ 18	= **$0.00**
INDEPENDENT CLAIMS (37 CFR 1.16(b))	**1** - 3 =	**0**	x $ 80	= **$0.00**
MULTIPLE DEPENDENT CLAIMS (IF APPLICABLE) (37 CFR 1.16(d))		ANY - - **0**	$ 270	= **$0.00**
BASIC FEE (37 CFR 1.16(a))				$710.00
TOTAL			=	**$ 710.00**

21. ☒ The Commissioner is hereby authorized to charge any filing or prosecution fees which may be required, under 37 CFR 1.16, 1.17, and 1.21 (but not 1.18), or to credit any overpayment, to Account No. 24-0025. An additional copy of this form is enclosed.

22. ☒ This is an authorization under 37 CFR 1.136(a)(3) to treat any concurrent or future reply, requiring a petition for extension of time, as incorporating a petition for the appropriate extension of time.

23. ☐ Amend the specification by inserting before the first line the sentence:
--This application is a ☐ continuation ☐ continuation-in-part ☐ divisional of Application(s) No(s). , filed .--

24. ☐ A CIP declaration is enclosed.

25. ☒ Power of Attorney

a. ☐ The power of attorney appears in the original papers of the enclosed prior application.
b. ☐ Enclosed is a copy of the declaration and power of attorney from the enclosed prior application.
c. ☒ A new declaration with power of attorney is enclosed.

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26. ☐ The following inventors named in the prior application are deleted per 37 CFR 1.53(b)(1), 1.63(d)(2) and 1.33 (b):

27. ☐ This application is adding one or more inventors under 37 CFR 1.48 to a previously executed application, with an enclosed: petition, fee, newly executed declaration from all inventors, and written consent of the assignee.

28. ☒ This application claims the priority benefit of one or more Provisional Application No(s). 60/168,293 and the first sentence of this application has been or will be amended to so indicate.

29. ☐ Priority is claimed from
(reinsert all previous priority claims for the entire chain of any prior applications).

30. ☐ Other paper(s) enclosed:

Respectfully submitted,

Robert Hutter
Signature per 37 CFR 1.33 & 34
Date: 10/23/2000
Registration No. 32,418
Telephone No. 716-423-3811

CREATING MULTI-PAGE DOCUMENTS USING TIFF FILES

Reference to Provisional Application

The present application claims priority from US Provisional Application Serial No. 60/168,293, filed December 1, 1999.

Field of the Invention

The present invention is directed to a method for representing a multi-page document using a hierarchically-organized set of TIFF files.

Background of the Invention

"TIFF-FX" is a proposed standard for the rendering and retention of image data. It is useful for transmission of facsimile-format documents over the Internet, and encompasses other standards such as JPEG, JBIG, and color fax standards. One aspect of TIFF-FX is that there is a special problem with rendering multi-page documents, and/or page images having multiple components (such as combinations of text, contone images, and line art) in a coherent format.

In TIFF-FX, different types of image components (text, line art, contone) can be compressed in various ways, such as JBIG, JPEG, or fax formats. The different compression arrangements or schemes are called "profiles." Examples of profiles are:

S= b/w, simple compression algorithm

F= b/w, richer compression algorithm

J= b/w, JBIG compression

C= color JPEG compression

L= color JBIG compression

M= MRC = "mixed raster content" = in each page, different components are compressed in different ways. Different components of a page image are organized as "mask," "upper," and "lower," which are ultimately combined to create a single, multi-component page image. Typically, the "mask" is text, compressed in binary, JBIG, or the fax compressions Modified Huffman, Modified Read, or Modified Modified Read. The "lower" portion is typically contone images compressed in JPEG. The "upper" portion is typically line art compressed in GZIP.

The present invention is directed to a system for organizing image data in a heterogeneous form, such as including both color and monochrome images, or images compressed according to different schemes, so that a TIFF-FX writer can automatically organize the data to create a single multi-page document.

Description of the Prior Art

U.S. Patent **5,706,457** discloses a system for acquiring and archiving images derived from multiple sources. An operator of the system can perform only a predetermined set of functions corresponding to graphical icons. Each of the icons launches a set of macro functions that format the image data into a predetermined format.

U.S. Patent **5,724,579** discloses a system for producing "subordinate images" extracted from our original image data. The subordinate image data can be images directed to a portion of the original data, or subset of the original data making a thumbnail of the original data. A first subordinate image is extracted from original image data, and a second subordinate image is in turn extracted from the first subordinate image data. The main image data and the first and second subordinate image data are stored in the same file.

U.S. Patent **6,052,198** discloses a system for organizing files associated with a single job ticket, such as in a digital printing context. The job ticket includes information on print files included in a print job, print file location information indicating a location of print files in a storage device, and information indicating a location of a rasterized of version of a print file in the storage device.

When the job ticket is submitted to a printing apparatus, a rasterized version of the data is submitted instead of the original print file if the rasterized version was modified after the print file was modified.

Summary of the Invention

According to one aspect of the present invention, there is provided a method of organizing image data to create a multi-page document, comprising the steps of naming each of a set of files, each file representing either a page image or an image component of a page image, according to a naming convention, organizing the files into a hierarchical directory structure, and applying a writer application which recognizes the files by the naming convention to create a single, multi-page document.

Brief Description of the Drawing

Figure 1 describes an input file organization according to an embodiment of the present invention.

Detailed Description of the Invention

According to the present invention, a naming convention and directory structure is used to identify individual page images and/or page image components within a multi-page document, so that a multi-page, multi-component "source file" can be created. The basic approach to converting many single page TIFF files into a single TIFF-FX file is to: (1) organize the original TIFF files into a specified architecture (by a combination of naming convention and directory structure); and (2) execute a known TIFF-FX writer application to convert the set of TIFF files into the TIFF-FX file.

The input data to the writer must be in a particular hierarchy on a disk to be properly handled. Figure 1 describes the input file organization. It can be seen in the Figure that a TIFF-FX writer can recognize a single page input file, a directory of input files (for a multi-page document of simple pages), or as a directory of directories (for a multi-page document wherein some or all pages

have multiple components, as described above). Quality Logic (formerly Genoa Systems) currently sells a product "TIFF-FXpert Test System" used to evaluate TIFF-FX files: this product can be used as a writer within the context of the present invention.

According to one embodiment of the present invention, there are three modes to the TIFF-FX writer. If the "source argument" (the name of the file desired to be considered a single document) is a simple file name, then a single page TIFF-FX file will be generated. In such a case, any profile may be requested except the MRC profile, M. If the source argument is a directory of files, then a multi-page TIFF-FX document is generated. According to the convention of one embodiment, each file in the directory must have a file name "PageN" where N is a page number starting with 1. Source files not obeying this convention are ignored. Once again, in this case any profile may be requested except the MRC profile, M.

To support the MRC profile, M, the source argument, may represent a directory of page directories. Each file must contain at least three files, which, in one convention, are named Mask, Lower, and Upper, corresponding to the roles described above in MRC profile layers. To test profile M, input data follow this format. All other files will be ignored.

According to one alternate embodiment, there may also be included, in the hierarchy, an "info" or "directive" file, which contains data relating to at least some of the other files within the same directory. This "info" file could include instructions that, for instance, the text in the mask within the same directory should be compressed in a specific way, such as in G3 format, or the contone data must be compressed in JPEG; also, the info file can specify a particular quality level for the compression algorithm.

In a preferred embodiment, all source files should conform to TIFF6 (baseline + standard extensions) specifications.

With all source images in the format described above, the TIFF-FX writer can proceed to read original data in various formats and emit the hierarchically-organized TIFF-FX files.

Although a TIFF-FX implementation is shown here, the basic principle can be applied to the creation of other multi-page document formats.

The present invention simplifies the testing and debugging of TIFF-FX images. TIFF-FX files can potentially represent many pages of image data, each page being quite complex (i.e., profile M). Real applications may require significant additional processing (e.g., segmentation of an image into Foreground, Background, and Mask layers). This representation allows separation of the development of segmentation algorithms from the development of the TIFF-FX writers/readers, and defines a common means by which developers can interchange test data. The present invention can be used to convert existing repositories of document data into TIFF-FX files. Scripts can be constructed that would take existing repositories and convert them into the appropriate hierarchy, then a TIFF-FX writer would generate the TIFF-FX files.

CLAIMS:

1. A method of organizing image data to create a multi-page document, comprising the steps of:

naming each file of a set of files, each file representing either a page image or an image component of a page image, according to a naming convention; and

organizing said files into a hierarchical arrangement; and

applying a writer application which recognizes the files by the naming convention to write a single file, multi-page document.

2. The method of **claim 1**, the naming step including providing a file within the set of files with a simple file name, the simple file name causing the writer application to generate a single page file.

3. The method of **claim 1**, the naming step including naming a file within the set of files as a directory of source files, the directory causing the writer application to generate a multi-page document.

4. The method of **claim 1**, wherein each file in the directory is named according to a naming convention which identifies each file within the directory as relating to a page.

5. The method of **claim 1**, the naming step including naming a file within the set of files as a directory of page directories, the directory causing the writer application to generate a multi-page document with each page directory corresponding to a page.

6. The method of **claim 5**, wherein each page directory includes a plurality of files, each file corresponding to a page image component for a single page image.

7. The method of **claim 6**, wherein the page image components are MRC profile layers in TIFF-FX.

8. The method of **claim 1**, further comprising the step of including, among the set of files, a directive file, the directive file being readable by the writer application and instructing the writer application to process another file in the set of files in a predetermined manner.

9. The method of **claim 8**, wherein the predetermined manner relates to selecting a compression technique.

10. The method of **claim 8**, wherein the predetermined manner relates to selecting a quality level for a compression technique.

11. The method of **claim 1**, wherein a first file in the set of files is compressed according to a first compression scheme, and a second file in the set of files is compressed according to a second compression scheme.

12. The method of **claim 1**, wherein a first file in the set of files relates to a monochrome image, and a second file in the set of files relates to a color image.

ABSTRACT

A system for organizing a heterogeneous set of page image data, such as including both simple-compressed and JPEG compressed, and/or color and monochrome data, so that the data can be organized as a single, multi-page, TIFF-FX document. Different page images and image components are named according to a simple convention. When a TIFF-FX writer application is applied to the data, the writer application responds to the names of the files and the file hierarchy to write a single, multi-page TIFF-FX document.

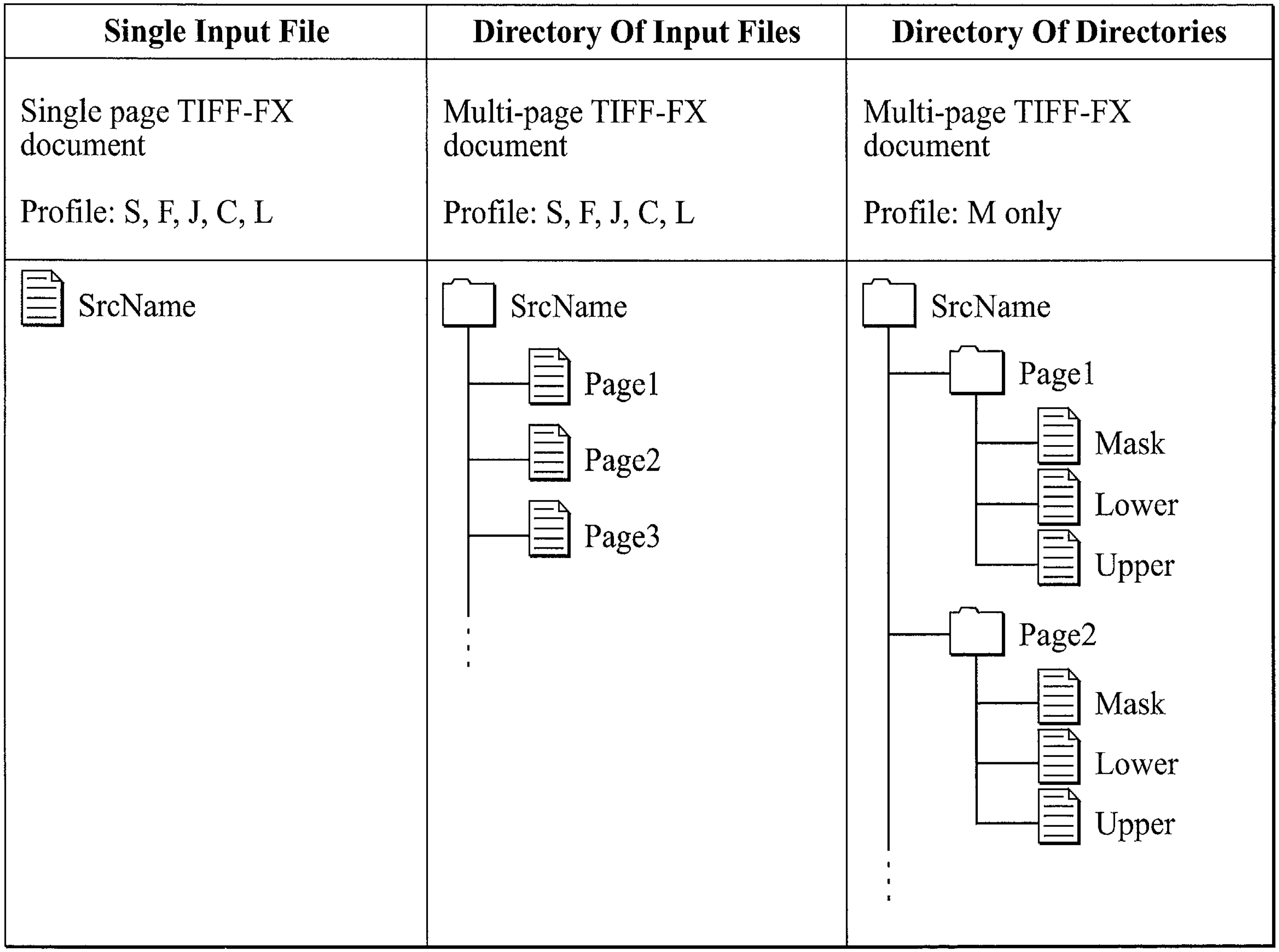
Single Input File
Directory Of Input Files
Directory Of Directories
Single page TIFF-FX document
Profile: S, F, J, C, L
Multi-page TIFF-FX document
Profile: S, F, J, C, L
Multi-page TIFF-FX document
Profile: M only
SrcName
SrcName
Page1
Page2
Page3
SrcName
Page1
Mask
Lower
Upper
Page2
Mask
Lower
Upper

FIG. 1

PATENT APPLICATION

Attorney Docket No. D/99807

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **METHOD OF CREATING MULTI-PAGE DOCUMENTS FROM TIFF IMAGES**

the specification and claims of which
☒ are attached hereto OR ☐ was filed on _____ as U.S. Application No. _____

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information which is material to the patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim priority benefits under Title 35, United States Code, §119 of any foreign or U.S. Provisional application(s) for patent listed below, and have also identified below any foreign application(s) or Provisional application(s) for patent having a filing date before that of the application on which priority is claimed:

Prior Foreign or U.S. Provisional Application(s)

60/168,293	USA	01/12/1999
(Number)	(Country)	(Day/Month/Year Filed)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following registered practitioners to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

John E. Beck	**Reg. No. 22,833;**	**Henry Fleischer**	**Reg. No. 25,582;**
Ronald F. Chapuran	**Reg. No. 26,402;**	**Eugene O. Palazzo**	**Reg. No. 20,881;**
Mark Costello	**Reg. No. 31,342;**	**Denis A. Robitaille**	**Reg. No. 34,098;**
Richard B. Domingo	**Reg. No. 36,784;**	**Robert Hutter**	**Reg. No. 32,418;**

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

DECLARATION AND POWER OF ATTORNEY, continued

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Inventor's Signature: Dennis L Venable Date: 10/19/2000

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